Getting Started

With

HMI Tools

Using

SourceGate II

Version 4

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Introduction

The purpose of this Getting Started Guide is to provide user level documentation to aid in installing, setting up and starting Avocet's HMI products. These tools include the SourceGate II debugger, Avocet's HMI in-circuit emulators and Background Mode Debuggers (BMD). Additional documentation is available either from the SourceGate Online Help or from various Application Notes on the software CD. SourceGate documentation is available only in online form.

Contact

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What To Do

The basic steps to getting SourceGate and the emulator or BMD installed and functioning are given in the list below. Each step is described in detail in the following pages.

1. Verify the contents of your shipment.
2. Verify that your system meets or exceeds the minimum requirements.
3. Install the SourceGate II debugger.
4. Familiarize yourself with the emulator or BMD.
5. Connect the emulator or BMD to your host and target board.
6. Apply power to the emulator or BMD, and to the target board.
7. Start the SourceGate II debugger.
8. Operate the emulator or BMD using the SourceGate II debugger.
9. Exit the SourceGate II debugger.
10. Remove power from the emulator or BMD, and the target board.

Shipment Inventory

This section lists the items included in your HMI package. Take time now to check the contents of your package with the appropriate inventory list given below. If your package is not complete, then contact Avocet either by phone at 800-448-8500 or by email at hmisupport@avocetsystems.com.

SPS-2000 Emulator

No.	Description
1.	Getting Started Guide
2.	Software CD
3.	SPS-2000 emulator: includes 1. SPS-2000 main unit 2. SPS Pod 3. Target Pod
4.	Power cord
5.	RS-232 cable, 25-pin
6.	RS-232 adapter, 25-pin to 9-pin
7.	RS-232 adapter, 25-pin to RJ11 phone jack
8.	RJ11 four wire phone cable

HMI-200 Series Emulator

No.	Description
1.	Getting Started Guide
2.	Software CD
3.	HMI-200 emulator: includes 1. HMI-200 main unit 2. Target Pod
4.	Power cord
5.	RS-232 cable, 25-pin
6.	RS-232 adapter, 25-pin to 9-pin

Background Mode Debugger (LED models)

No.	Description
1.	Getting Started Guide
2.	Software CD
3.	BMD
4.	External power adapter (wall transformer)

Background Mode Debugger (non-LED models)

No.	Description
1.	Getting Started Guide
2.	Software CD
3.	BMD
4.	10-pin Target Power Adapter (CPU32, CPU32+ and MPC only)

System Requirements

This section describes the system requirements for installing and using the SourceGate II debugger.

Hardware

SourceGate II requires the following minimum hardware:

- 486, or higher computer
- Mouse or trackball
- CD disk drive (for software installation)
- An appropriate I/O connection: serial port, ethernet connection or USB connection
- At least 8MB of hard disk storage

Operating System

Window 3.1x or higher for the 16-bit version of SourceGate (does not support USB). (Neither the CD installer nor the SourceGate installer run under Windows 3.1x.)

Windows 95/98/Me/2000 or XP for the 32-bit version of SourceGate using a USB connection.

Windows 95/98/Me/XP, Windows NT 3.5/4.0 or Windows 2000 for the 32-bit version of SourceGate using other than a USB connection.

Installing SourceGate II / USB-BMD on Windows XP

1) Put SourceGate II CD into CD Drive. The installer should start automatically. If not, go to your CD drive in Windows Explorer and double-click on Setup to start installer.

2) Go through installer, clicking on appropriate check marks for the processor you are using. When SourceGate completes it's install it will prompt you to restart. Click on Yes.

3) After Windows XP has restarted, FIRST power up the BMD, AND THEN connect the USB connector to an open USB port on your PC.

4) Windows will detect new hardware and start the "Found New Hardware Wizard". Select "Install the Software automatically (the "Recommended" choice). Ignore the popup warning about Windows Logo testing by clicking on "Continue Anyway". Finish Hardware Wizard.

5) Reboot, leaving BMD powered and connected to PC.

6) Windows will again detect new hardware. Repeat Step 4.

You are now ready to use your USB-BMD

Software Installation

This section describes the procedures for installing the SourceGate II version 4.x.x debugger. (Neither the CD installer nor the SourceGate installer run under Windows 3.1x.)

1. Insert the SourceGate software CD into your CD-ROM drive. (The CD contains software other than the SourceGate II debugger. These other software packages may be installed by making the appropriate selection from the CD installer's main window, which is presented below.)

2. Windows may automatically start the CD's installation software. If the installer doesn't begin automatically, then do the following. From the Start menu select the Run option. In the Run window that appears select the Browse button. In the Browse window that appears move to the CD-ROM drive and select the application setup.exe from the root directory. Then select the OK button from the Run window.

3. Following a brief delay, the CD installer's main window appears. From this window click the button for the SourceGate version to be installed.

4. After another brief delay the SourceGate installer main window will appear. The installer will then read and process a couple SourceGate data files and present the Welcome window. Click on the Next button.

5. The Product List window then appears with a complete list of all the hardware products supported by the SourceGate II debugger. From this list select the appropriate product then click the Next button.

6. The Family List window then appears with a complete list of the processor families supported by the selected hardware product. From this list select the appropriate processor family then click the Next button.

7. The Processor List window then appears with a complete list of the processors supported by the selected hardware product and processor family. From this list select one or more processors, or all of them, then click the Next button.

8. The I/O Channel window then appears with a complete list of the I/O options supported by the previously selected hardware product. From this list select the I/O channel type that will be used to communicate with the previously selected hardware product, then click the Next button. If the Serial I/O option is selected then a COM Port List window and a Baudrate List window will follow. From these

windows select the desired options followed by clicking the Next button. If the Ethernet I/O option is selected then an Ethernet Host Name window appears. In this window enter an ethernet host name or IP address number then click the Next button. If the USB I/O option is selected then no addition communications setup data is required.

9. The Select Program Folder window then appears in order to request the program folder name into which SourceGate and its components will be installed. In this window either click the Next button to accept the default program folder name, edit the Program Folders field to specify a custom program folder name then click the Next button, or select from the list of existing top level program folder names then click the Next button.

10. The Choose Destination Location window then appears to request the directory into which SourceGate and its files will be installed (some files may also be installed into the Windows system and inf directories). In this window either click the Next button to accept the default directory or click the Browse button to specify a custom directory name then click the Next button.

    WARNING: Do not perform an install into a directory containing a different version of SourceGate. This applies to both version number differences (i.e. 4.0.0 vs. 4.0.1), build number differences (i.e. beta 15 vs. beta 16) and build size differences (i.e. 16-bit vs. 32-bit). If this warning is not observed, then both installed versions may be corrupted and fail to function properly.

11. The Edit Data window then appears to request the name of the menu item (and shortcut) by which SourceGate will be accessed (other menu items/shortcuts will be installed with predefined names). In this window either click the Next button to accept the default name or edit the Short Cut field to specify a custom name then click the Next button.

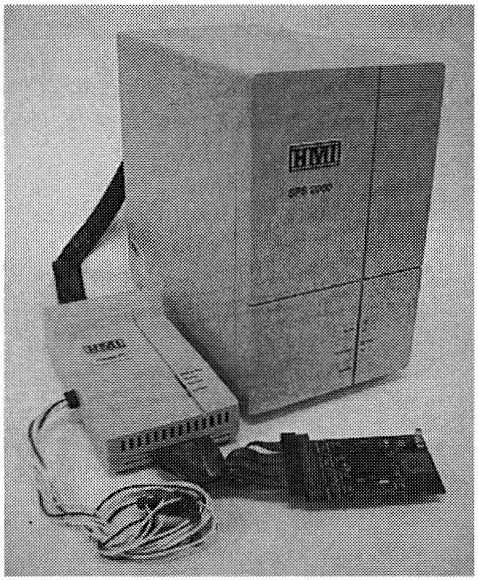
12. The Start Copying Files window will then appear presenting a complete summary of the installation options specified. The summary includes all menu items (shortcuts) that will be installed along with all files that will be installed. Review the summary before proceeding. Clicking the Next button will begin the process of creating the menu items (shortcuts) and copying files to your hard disk. Click the Next button when finished reviewing the summary.

13. When the installation process is complete the Setup Complete window will appear. Click the Finish button to exit the installer. Before attempting to run SourceGate restart your computer.

Product Descriptions

This section gives descriptions of the HMI Tools hardware products. Read this section to familiarize yourself with the products and their components and features.

SPS-2000 Emulator



The SPS-2000 emulator consists primarily of the SPS-2000 main unit, the SPS Pod and the Target Pod. Refer to the example figure at right. Each component is described in the following paragraphs.

SPS-2000 Main Unit: Front

The following paragraphs describe the emulator features accessible from the front of the main unit.

Status Indicators: RS232

These two (2) LEDs reflect the status of the emulator's serial I/O connection when the serial port is in use. The TX LED flashes as the emulator transmits data to the host. The RX LED flashes as the emulator receives data from the host.

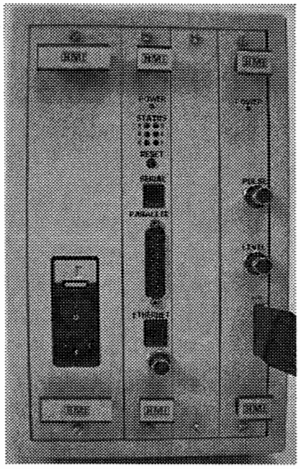
Status Indicators: ETHERNET

These two (2) LEDs reflect the status of the emulator's ethernet I/O connection when the ethernet port is in use. The ACTIVE LED illuminates when the ethernet connection is in use. The TX LED flashes as the emulator transmits data to the host.

Status Indicators: POWER

This LED illuminates when the emulator is properly plugged in and turned on. When this LED is illuminated the fan in the right side of the emulator should also be running and forcing air out of the emulator.

SPS-2000 Main Unit: Back



The following paragraphs describe the emulator features accessible from the back of the main unit. Refer to the example figure at right.

Power Connection, Power Switch, Power Status Indicators

The standard 3-prong power cable supplied should be plugged into the emulator and into a wall outlet. This unit will accept virtually any 110-240V, 50-60Hz supply voltage used in the world. The power supply is auto detecting so no switches are needed to switch between 110V and 240V. With power applied and the switch turned on, the fan in the right side of the emulator should be running and forcing air out of the enclosure and the three POWER LEDs should illuminate (one on the front panel, and two towards the top of the back panel).

STATUS Indicators

The six (6) STATUS indicator LEDs are for internal HMI use and are not described here.

RESET Switch

The RESET switch is pressed to reset the emulator. This button should be pressed before signing on to the emulator serially, when changing serial parameters such as baudrate or COM port setting, or when having problems communication with the emulator. Do not press this button while running SourceGate as this will interfere with normal SourceGate operation and may result in abnormal SourceGate termination. Pressing the reset switch five times in succession (waiting about one second between presses) will force the emulator to perform a factory reset.

SERIAL Port

The emulator's RS-232 SERIAL port connects to a host's standard serial port. The serial port is used for primary communication with the host by SourceGate. The emulator's serial connection accepts a standard 4-wire RJ11 plug connecting to a host's standard 9 or 25 pin serial connection. The port's configuration is: autobaud detection (9600, 19200, 38400, 57600 or 115200 baud), no parity, 8 data bits, 2 stop bits, DCE.

PARALLEL Port

The emulator's PARALLEL port connects to a host's standard parallel port. The parallel port is used exclusively for downloading user code to the emulator in order to reduce file download transfer times. The parallel port can be used in conjunction with the serial port, but not with either ethernet connection.

ETHERNET Connections

The emulator supports both a standard 8-wire RJ45 style 10Base-T connection and a standard BNC style 10Base-2 connection. Either connection can be used to attach to an existing ethernet network. The ethernet connection is used for primary communication with the host by SourceGate.

NOTE: The emulator's ethernet settings must be configured prior to signing on to the emulator over the ethernet connection. This procedure uses the RS232 port and is described in detail in the application note titled *Configuring An Emulator For Ethernet Operation*.

Trigger Output: PULSE Connection

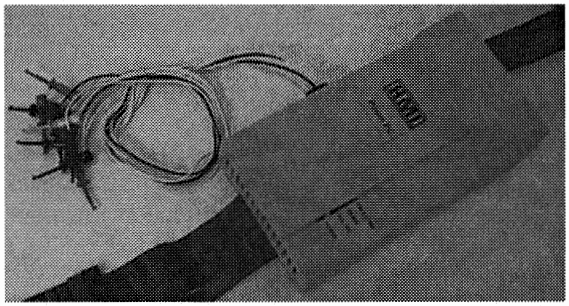
This BNC connector will output a pulse signal that can be used to trigger other pieces of test equipment such as a Logic Analyzer or Oscilloscope. This emulator feature is accessed and configured via SourceGate's Setup menu.

Trigger Output: LEVEL Connection

This BNC connector will output a level signal that can be used to trigger other pieces of test equipment such as a Logic Analyzer or Oscilloscope. This emulator feature is accessed and configured via SourceGate's Setup menu.

SPS Pod

The following few paragraphs describe the emulator features accessible from the SPS Pod. Refer to the example figure at right.



Status Indicators: Processor State

These three (3) LEDs reflect the run status of the emulation processor. If the EMULATING LED is lit, then the processor is running. If the IDLING LED is lit then the processor is in an idle state. If the HALTED LED is lit then the processor is halted.

Status Indicator: POWER

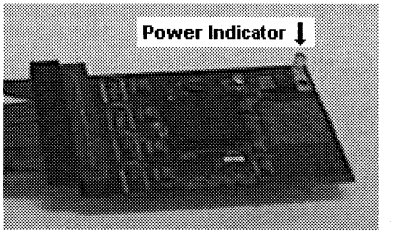
This LED illuminates when the SPS Pod is properly powered from the main unit. When this LED is illuminated the fan in the back of the SPS Pod should also be running and forcing air out of the enclosure.

Trace Leads

These eight (8) external trace clip leads permit target based signals to be used in the emulator's breakpoint and trace trigger setup. This emulator feature is accessed and configured via SourceGate's Setup menu. The inputs accept TTL level signals only. The leads are color coded for ease of use.

Target Pod

The SPS-2000 Target Pod is an Active Target Pod in that it includes active circuitry and a processor that functionally replaces the processor on the target board. Refer to the example figure at right. The following paragraphs describe the emulator features accessible from the Target Pod.

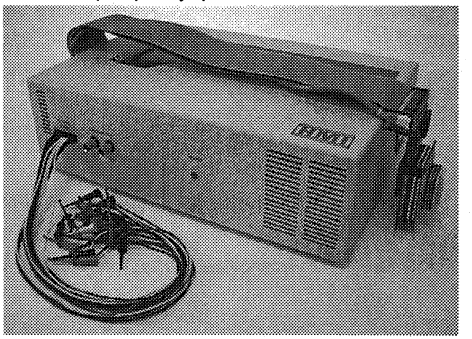


Status Indicator: POWER

This LED illuminates when the Target Pod is properly powered from the SPS Pod.

HMI-200 Series Emulator

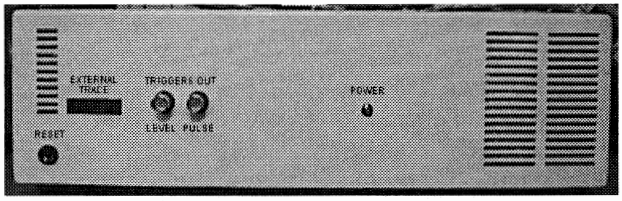
The HMI-200 series emulator consists primarily of the HMI-200 main unit and the Target Pod. Refer to the example figure at right. Each component is described in the following paragraphs.



HMI-200 Main Unit: Front

The following paragraphs describe the emulator features accessible from the front of the main unit. Refer to the example figure at below.

RESET Switch



The RESET switch is pressed to reset the emulator. This button should be pressed before signing on to the emulator serially, when changing serial parameters such as baudrate or COM port setting, or when having problems communication with the emulator. Do not press this button while running SourceGate as this will interfere with normal SourceGate operation and may result in abnormal SourceGate termination. Pressing the reset switch five times in succession (waiting about one second between presses) will force the emulator to perform a factory reset.

OptionalTrace Leads

These 16 External Trace clip leads permit target based signals to be used in the emulator's breakpoint and trace trigger setup. This emulator feature is accessed and configured via SourceGate's Setup menu. The inputs accept TTL level signals only. The leads are color coded for ease of use.

TRIGGERS OUT: LEVEL Connection

This BNC connector will output a level signal that can be used to trigger other pieces of test equipment such as a Logic Analyzer or Oscilloscope. This emulator feature is accessed and configured via SourceGate's Setup menu.

TRIGGERS OUT: PULSE Connection

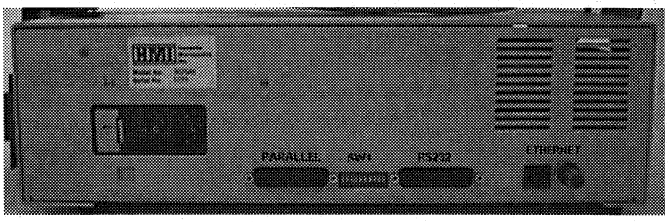
This BNC connector will output a pulse signal that can be used to trigger other pieces of test equipment such as a Logic Analyzer or Oscilloscope. This emulator feature is accessed and configured via SourceGate's Setup menu.

Status Indicator: POWER

This LED illuminates when the emulator is properly plugged in and turned on. When this LED is illuminated the fan in the rear of the emulator should also be running and forcing air out of the emulator's enclosure.

HMI-200 Main Unit: Back (style 1)

The following paragraphs describe the emulator features accessed from the back of the main unit where the back panel is of the style given in the figure at the right.



Power Connection, Power Switch, POWER Status Indicators

The standard 3-prong power cable supplied should be plugged into the emulator and to a wall outlet. This unit will accept virtually any 110-240V, 50-60Hz supply voltage used in the world. The power supply is auto detecting so no switches are needed to switch between 110V and 240V. With power applied and the switch turned on, the fan in the right side of the emulator should be running and forcing air out of the enclosure, and the POWER lamp on the emulator's front panel should illuminate.

PARALLEL Port

The emulator's PARALLEL port connects to a host's standard parallel port. The parallel port is used exclusively for downloading user code to the emulator in order to reduce file download transfer times. The parallel port can be used in conjunction with the serial port, but neither ethernet connection.

Configuration DIP Switches: SW1

This series of DIP switches controls the emulator's RS232 serial port configuration. All switches should remain in the DOWN position. The configuration this produces is: autobaud detection, no parity, 8 data bits, 2 stop bits, DCE. With autobaud detection the emulator will automatically sense and select standard baudrates from 110 to 115200 baud. Refer to SourceGate's online help for detailed information about the DIP switch settings.

RS232 Port

The emulator's RS232 serial port connects to a host's standard serial port. The serial port is used for primary communication with the host by SourceGate. The emulator's serial connection accepts a standard 25 pin serial connection. The serial port's configuration is controlled by the settings of the SW1 dip switches. The factory configuration is described in the previous paragraph.

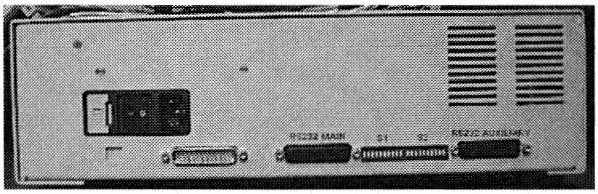
ETHERNET Connections (optional)

Emulator's with this style back panel may be equiped with an optional ethernet interface. This interface support includes both a standard 8-wire RJ45 style 10Base-T connection and a standard BNC style 10Base-2 connection. Either connection can be used to attach to an existing ethernet network. The ethernet connection is used for primary communication with the host by SourceGate.

NOTE: The emulator's ethernet settings must be configured prior to signing on to the emulator over the ethernet connection. This procedure uses the RS232 port and is described in detail in the application note titled *Configuring An Emulator For Ethernet Operation.*

HMI-200 Main Unit: Back (style 2)

The following paragraphs describe the emulator features accessed from the back of the main unit where the back panel is of the style given in the example figure at right.



Power Connection, Power Switch, POWER Status Indicators

The standard 3-prong power cable supplied should be plugged into the emulator and to a wall outlet. This unit will accept virtually any 110-240V, 50-60Hz supply voltage used in the world. The power supply is auto detecting so no switches are needed to switch between 110V and 240V. With power applied and the switch turned on, the fan in the right side of the emulator should be running and forcing air out of the enclosure, and the POWER lamp on the emulator's front panel should illuminate.

Parallel Port (unlabeled)

The emulator's parallel port connects to a host's standard parallel port. The parallel port is used exclusively for downloading user code to the emulator in order to reduce file download transfer times. The parallel port can be used in conjunction with the serial port, but not with the auxiliary serial connection nor either ethernet connection.

RS232 MAIN Port

The emulator's RS232 MAIN serial port connects to a host's standard serial port. This main serial port is used for primary communication with the host by SourceGate. This serial connection accepts a standard 25 pin serial connection. This serial port's configuration is controlled by the settings of the S1 dip switches. The factory configuration is described in the following paragraph.

Configuration DIP Switches: S1

This series of DIP switches controls the emulator's RS232 MAIN serial port configuration. All switches should remain in the DOWN position. The configuration this produces is: autobaud detection, no parity, 8 data bits, 2 stop bits, DCE. With autobaud detection the emulator will automatically sense and select baudrates of 9600, 19200, 38400, 57600 and 115200 baud. Refer to SourceGate's online help for detailed information about the DIP switch settings.

Configuration DIP Switches: S2

This series of DIP switches controls the emulator's RS232 AUXILIARY serial port configuration. All switches should remain in the DOWN position. The configuration this produces is: autobaud detection, no parity, 8 data bits, 2 stop bits, DCE. With autobaud detection the emulator will automatically sense and select baudrates of 9600, 19200, 38400, 57600 and 115200 baud. Refer to SourceGate's online help for detailed information about the DIP switch settings.

RS232 AUXILIARY Port

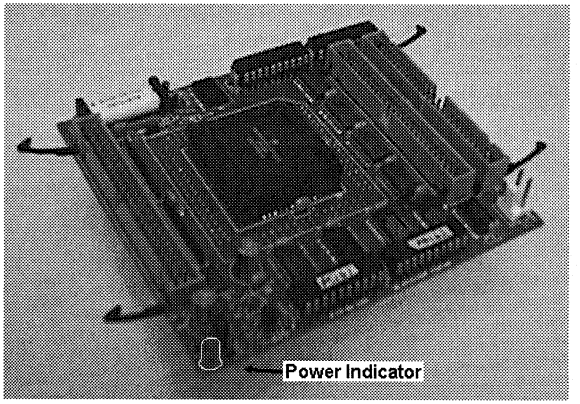
The emulator's RS232 AUXILIARY serial port connects to a host's standard serial port. This auxiliary serial port is used exclusively for file downloads to the emulator from the host by SourceGate. This serial port can be used in conjunction with the main serial port, but not with the parallel port connection nor either ethernet connection. This serial connection accepts a standard 25 pin serial connection. This serial port's configuration is controlled by the settings of the S2 dip switches. The factory configuration is described in the previous paragraph.

Target Pod

The following paragraphs describe the emulator features accessed from the Target Pod, which comes in two forms. Each is described in the following paragraphs.

Active Target Pod

Active Target Pods include active circuitry and a processor that functionally replaces the processor on the target board. Refer to the example figure at right which shows an Active Target Pod with the pod interface cables removed for clarity. All emulators with an Active Target Pod can function standalone without the Target Pod being attached to a target board.

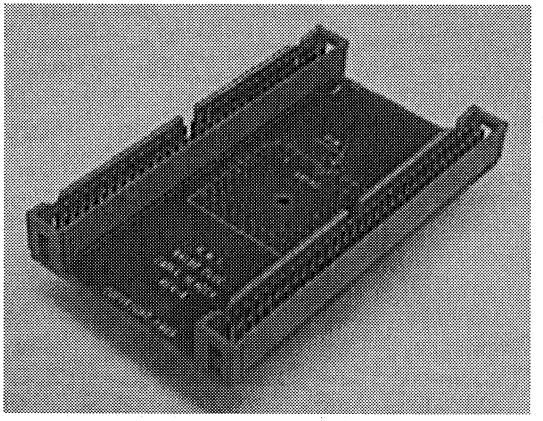


Status Indicator: POWER

This LED illuminates when the Target Pod is properly powered from the main unit.

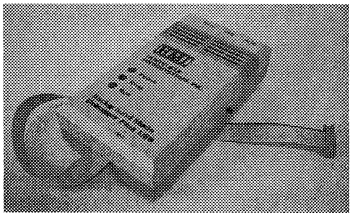
Passive Target Pod

Passive Target Pods include neither active circuitry nor an emulation processor. Refer to the example figure at right which shows a Passive Target Pod with the pod interface cables removed for clarity. Virtually all emulators with a Passive Target Pod can function standalone without the Target Pod being attached to a target board.



Background Mode Debugger (BMD)

The BMD comes in Serial and USB models, both of which are described in the paragraphs below.



USB BMD

The USB BMD consists primarily of the BMD unit with its attached background port cable, and an external power adapter. These BMDs are intended for 5 volt and 3.3 volt target systems. Refer to the example figure at right. The features of this BMD are described in the following paragraphs. There are two user configurable jumpers inside this BMD which are also described.

Exterior Features

The previous figure includes an example BMD with most of its externally accessible features (the rear panel is not visible in this figure). The features visible in this figure are described in the following paragraphs.

Status Indicator: POWER

This LED illuminates when the BMD is properly powered. The power source is selectable via an internal jumper and can be either the external power adapter (not pictured) or the target board. Refer to the *Power Source Jumper* sections below for information on the BMD's power requirements when powered from the target board.

Status Indicator: STOP

This LED reflects the BMD's initialization status and the processor's halt status. If neither this nor the RUN LED is lit, then the BMD has not been initialized by SourceGate. If the LED is lit then the BMD has been initialized and the processor is halted.

Status Indicator: RUN

This LED reflects the BMD's initialization status and the processor's run status. If neither this nor the STOP LED is lit, then the BMD has not been initialized by SourceGate. If the LED is lit then the BMD has been initialized and the processor is running.

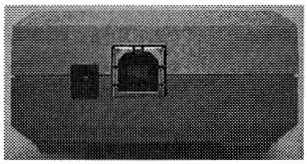
RESET Switch

The RESET switch is pressed to reset the BMD. This button should be pressed before signing on to the BMD or when having problems communication with the BMD. Do not press this button while running SourceGate as this will interfere with normal SourceGate operation and may result in abnormal SourceGate termination.

Background Port Cable

The Background Port Cable connects to the target board's background port header. The red strand on the ribbon cable identifies pin 1 on the connector. Insure that this pin is connected to pin 1 on the target board's BDM header. Before attaching this cable to the target board be sure to set the BMD's Power Source and Target Voltage jumpers.

Enclosure Backend



The figure to the right includes an example of the BMD's back panel. The following paragraphs describe the features accessible from this view. On some USB BMDs there may be an additional opening to the right of the USB connection. This opening may have an RJ11 receptacle. This receptacle is not documented here as it is currently not functional.

Power Connection

The external power adapter plugs into this jack when the Power Source Jumper is set to the ACA position (AC Adapter). This is shown in the following figure. If the Power Source Jumper is set to TAR (Target Board) then the power jack is not functional.

USB Port

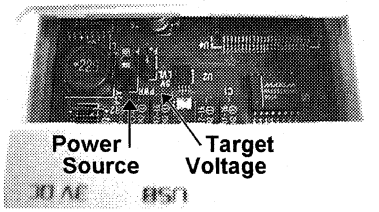
The BMD's USB port connects to a host's USB port. The USB port is used for primary communication with the host by SourceGate and accepts a standard USB peripheral connection.

Interior Features

The following paragraphs describe the BMD features accessed from the interior of the unit when the access cover is removed. The cover is removed by sliding it up away from the enclosure body. The panel is reinstalled in the reverse manner.

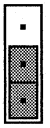
Access Cover (style 1)

The access cover, when removed, provides access to the two internal user configurable jumpers. Refer to the figure at right which shows an interior view of this style BMD from the back panel with the access cover removed.



Power Source Jumper

The jumper labeled P4 selects the BMD's power source and is the three pins located towards the left of the BMD. This jumper block is also labeled PWR and has positions labeled ACA and TAR. Refer to the figure above and the table below. Place the shorting clip over the two pins towards the front of the BMD, the TAR position, to select the Target Board as the BMD's power source. Place the shorting clip over the two pins towards the rear of the BMD, the ACA position, to select the external AC Adapter, which is supplied with the unit, as the BMD's power source. (* The AC Adapter setting is the factory default.)

Power Source	P4/PWR Jumper Placement
Target Board	TAR position (towards Background Port Cable) ACA position (towards the Power Connection)
AC Adapter*	 TAR position (towards Background Port Cable) ACA position (towards the Power Connection)

NOTE: When powering this style BMD from the target board, the target board must supply from 3VDC at 800 ma to 5VDC at 600 ma. The specific power needs vary with the processor in use.

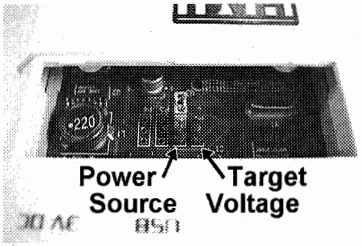
Target Voltage Jumper

The jumper labeled P3 sets the BMD's target board background port operating voltage level and is the two pins located to the immediate right of the Power Source Jumper. This jumper block is also labeled 5V LVL. Refer to the previous figure and the table below. Remove the shorting clip from the two pins to set the voltage level at 3 VDC. Install the shorting clip over the two pins to set the voltage level at 5 VDC. (* The 3 VDC setting is the factory default.)

Voltage Level	P3/5V LVL Jumper Placement
3 VDC *	jumper removed
5 VDC	jumper installed

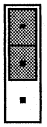
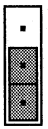
Access Cover (style 2)

The access cover, when removed, provides access to the two internal user configurable jumpers. Refer to the figure at right which shows an interior view of this style BMD from the back panel with the access cover removed.



Power Source Jumper

The jumper labeled P4 selects the BMD's power source and is the three pins located towards the center of the BMD. Refer to the figure above and the table below. Place the shorting clip over the two pins towards the front of the BMD to select the Target Board as the BMD's power source. Place the shorting clip over the two pins towards the rear of the BMD to select the external AC Adapter, which is supplied with the unit, as the BMD's power source. (* The AC Adapter setting is the factory default.)

Power Source	P4 Jumper Placement
Target Board	 Front of BMD (towards Background Port Cable) Rear of BMD (towards the Power Connection)
AC Adapter*	 Front of BMD (towards Background Port Cable) Rear of BMD (towards the Power Connection)

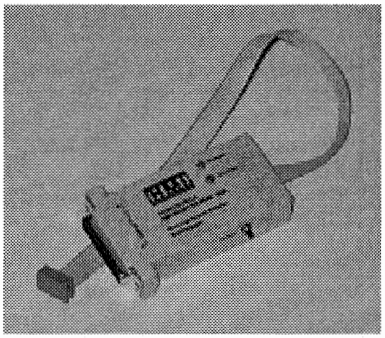
NOTE: When powering this style BMD from the target board, the target board must supply from 3VDC at 800 ma to 5VDC at 400 ma. The specific power needs vary with the processor in use.

Target Voltage Jumper

The jumper labeled P3 sets the BMD's target board background port operating voltage level and is the two pins located to the immediate right of the Power Source Jumper. Refer to the previous figure and the table on the following page. Remove the shorting clip from the two pins to set the voltage level at 3 VDC. Install the shorting clip over the two pins to set the voltage level at 5 VDC. (*The 3 VDC setting is the factory default.)

Voltage Level	P3 Jumper Placement
3 VDC*	jumper removed
5 VDC	jumper installed

Serial BMD (LED model)



This Serial BMD consists primarily of the BMD unit with its attached background port cable, and an external power adapter. This BMD model is intended for 5 volt and 3.3 volt target systems. The features of this BMD are described below. There are two user configurable jumpers inside this BMD which are also described.

Exterior Features

The previous figure includes an example BMD with most of its externally accessible features (the Power Connection is not visible in this figure). These features are described in the following paragraphs.

RS232 Port

The BMD's serial port connects to a host's standard serial port. The serial port is used for primary communication with the host by SourceGate and accepts a standard 25 pin serial connection. The port's configuration is: autobaud detection (9600, 19200, 38400, 57600 or 115200 baud), no parity, 8 data bits, 2 stop bits.

Status Indicator: POWER

This LED illuminates when the BMD is properly powered. The power source is selectable via an internal jumper and can be either the external power adapter (not pictured) or the target board. Refer to the *Power Source Jumper* section below for information on the BMD's power requirements when powered from the target board.

Status Indicator: STATUS

This LED reflects the BMD's initialization status and the processor's run status. If the LED is not lit, then the BMD has not been initialized by SourceGate. If the LED is lit and is green then the BMD is initialized and the processor is running. If the LED is lit and red then the BMD is initialized and the processor is halted.

RESET Switch

The RESET switch is pressed to reset the BMD. This button should be pressed before signing on to the BMD, when changing serial parameters such as baudrate or COM port setting, or when having problems communicating with the

BMD. Do not press this button while running SourceGate as this will interfere with normal SourceGate operation and may result in abnormal SourceGate termination.

Background Port Cable

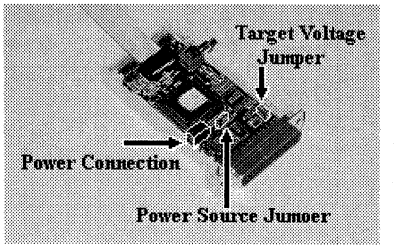
The Background Port Cable connects to the target board's background port header. The red strand on the ribbon cable identifies pin 1 on the connector. Insure that this pin is connected to pin 1 on the target board's BDM header. Before attaching this cable to the target board be sure to set the BMD's Power Source and Target Voltage jumpers.

Power Connection

The external power adapter plugs into this jack when the Power Source Jumper is set to the ACA position (AC Adapter). Refer to the example figure below. If the Power Source Jumper is set to TAR (Target Board) then the power jack is not functional.

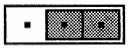
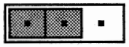
Interior Features

The figure to the right shows an example BMD with its internally accessible features. These features are described in the following paragraphs. The interior is accessed by prying the enclosure open using a small flat tip screwdriver in the small slots along the unit's sides.



Power Supply Jumper

The jumper labeled P8 selects the BMD's power source and is located towards the center of the BMD. This jumper is also labeled PWR and has positions labeled ACA and TAR. Refer to the previous figure and the table below. Place the shorting clip over the two pins towards the TAR label to select the Target Board as the BMD's power source. Place the shorting clip over the two pins towards the ACA label to select the external AC Adapter, which is supplied with the unit, as the BMD's power source. (*The AC Adapter setting is the factory default.)

Power Source	P8/PWR Jumper Placement
Target Board	ACA  TAR
AC Adapter*	ACA  TAR

NOTE: When powering this style BMD from the target board, the target board must supply from 3VDC at 410 ma to 5VDC at 220 ma. The specific power needs vary with the processor in use.

Target Voltage Jumper

The jumper labeled P1 sets the BMD's target board background port operating voltage level and is located towards the right of the BMD near the serial connector. This jumper is also labeled 5V LEVEL. Refer to the previous figure and the table below. Remove the shorting clip from the two pins to set the voltage level at 3 VDC. Install the shorting clip over the two pins to set the voltage level at 5 VDC. (*The 3 VDC setting is the factory default.)

Voltage Level	P1/5V LEVEL Jumper Placement	
3 VDC*		jumper removed
5 VDC		jumper installed

Serial BMD (non-LED model)

This Serial BMD consists of the BMD unit, its attached background port cable and a 10-pin Target Power Adapter (CPU32, CPU32+ and MPC models only) . This BMD model is intended for 5 volt systems only. Refer to the example figure at right. The features of this BMD are described in the below paragraphs. There are no internal user configurable jumpers for this BMD. This BMD is designed to draw its power needs from the target board. The power needs are 5 VDC at up to 220 ma. The specific power needs vary with the processor used and its family.

Exterior Features

The non-LED model Serial BMD features are described in the following paragraphs.

RS232 Port

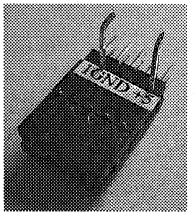
The BMD's serial port connects to a host's standard serial port. The serial port is used for primary communication with the host by SourceGate and accepts a standard 25 pin serial connection. The port's configuration is: autobaud detection (9600, 19200, 38400, 57600 or 115200 baud), no parity, 8 data bits, 2 stop bits.

Background Port Cable

The Background Port Cable connects to the target board's background port header. The red strand on the ribbon cable identifies pin 1 on the connector. Insure that this pin is connected to pin 1 on the target board's BDM header. Before attaching this cable to the target board verify that the target is able to supply the BMD's power needs, which are given above.

10-Pin Target Power Adapter

This adapter is provided only with BMD models for the Motorola CPU32/CPU32+ and Motorola PowerPC processors. Refer to the example figure at right. Normally this BMD's power is drawn from the target board. When the target board can't provide the required power this adapter can be used as a means of powering the BMD from an alternate, external 5 VDC power source. Refer to the 10-pin Target Power Adapter application note to power a non-LED serial BMD from an external power source.



Connection To The Target

This section gives instructions on connecting the emulator or BMD to the target board. It is strongly advised that the Product Description section of this document be read thoroughly before connecting the emulator or BMD to a target board. Refer to the next section of this document for the procedure on applying power to the product and the target board.

Emulators

The physical connection to the target comes in many forms; PLCC, PGA, DIP, BGA, solder adapters, Clip-on, etc. The procedure for connecting the Target Pod to the target board is essentially the same for all emulators. The procedure is as follows.

WARNING: Do not connect/disconnect the Target Pod to/from the target board with power applied! This must be done with power turned off to both the emulator and the target board. Doing so with power applied may damage both the emulator and the target board.

WARNING: If the Target Pod is misaligned when connected to the target board, then damage is likely to occur to the Target Pod and/or the target board when power is applied.

NOTE: Virtually all HMI emulators are fully functional without attaching the Target Pod to a target board.

1. Ensure that the power to the emulator is turned off.
2. Ensure that the power to the target board is turned off.
3. Locate Pin 1 on the Target Pod. This pin should be clearly marked.
4. Locate Pin 1 on the target board. This pin should also be clearly marked.
5. Physically align Pin 1 of the Target Pod connection with Pin 1 of the target board connection.
6. Very carefully mate the Target Pod connection with the target board connection.

Background Mode Debuggers

The physical connection to the target comes as either a 6-pin, a 10-pin, a 16-pin, or a 26-pin Berg style header attached to a ribbon cable. The procedure for connecting the BMD's Background Port Cable to the target board is essentially the same for all BMDs. The procedure is as follows.

WARNING: Do not connect/disconnect the Background Port Cable to/from the target board with power applied! This must be done with power turned off to both the BMD and the target board. Doing so with power applied may damage both the BMD and the target board.

WARNING: If the Background Port Cable is misaligned when connected to the target board, then damage is likely to occur to the BMD and/or the target board when power is applied.

NOTE: HMI BMDs are not functional unless attached to a target board.

1. Ensure that the power to the BMD is turned off.

2. Ensure that the power to the target board is turned off.

3. If the BMD in use has a Target Voltage Jumper, then verify that the jumper is set according to the operating voltage of the target board's background port. This is normally the processor's operating voltage level.

4. If the BMD in use has a Power Source Jumper, then verify that the jumper is set according to the power source in use.

   WARNING: The BMD will operate unreliably or not at all if the power source is insufficient.

   NOTE: Refer to the 10-pin Target Power Adapter application note to power a non-LED serial BMD from an external power source.

5. Locate Pin 1 on the Background Port Cable. This pin is clearly identifiable as it is the pin with the red strand going down the edge of the ribbon cable.

6. Locate Pin 1 on the target board. This pin should be clearly marked.

7. Physically align Pin 1 of the Background Port Cable with Pin 1 of the target board connection.

8. Very carefully connect the Background Port Cable header with the target board connection.

Applying Power

This section gives instructions on applying power to the emulator or BMD and to the target board. It is strongly advised that the Product Description section of this document be read thoroughly before applying power.

NOTE: Removing power from the emulator or BMD while running SourceGate may cause abnormal SourceGate termination.

Emulators

WARNING: Do not connect/disconnect the Target Pod to/from the target board with power applied! This must be done with power turned off to both the emulator and the target board. Doing so with power applied may damage both the emulator and the target board.

WARNING: It is likely to cause harm to the emulator if, for an extended period, power is applied to the emulator but removed from the target board. Harm is also likely if, for an extended period, power is applied to the target board but removed from the emulator.

Power Up

The preferred sequence is to apply power to the target board before applying power to the emulator. The reason for this sequence is to insure that the target clock is present while the emulator is in operation.

1. Apply power to the target board first.

2. Apply power to the emulator second.

NOTE: Some target systems may require that power be applied to the target board before being applied to the emulator.

NOTE: The emulator will rarely be harmed should power be applied to both the emulator and the target board simultaneously. The same is true should power be applied to the emulator first.

Power Down

The preferred sequence is to remove power from the emulator before removing power from the target board. The reason for this sequence is to insure that the target clock is present while the emulator is in operation.

1. Remove power from the emulator first.

2. Remove power from the target board second.

NOTE: The emulator will rarely be harmed should power be removed from both the emulator and the target board simultaneously. The same is true should power be removed from the emulator second.

Background Mode Debuggers

WARNING: Do not connect/disconnect the Background Port Cable to/from the target board with power applied! This must be done with power turned off to both the BMD and the target board. Doing so with power applied may damage both the BMD and the target board.

WARNING: It is possible to cause harm to the BMD or target board if, for an extended period, power is applied to the BMD but removed from the target board. Harm is also possible if, for an extended period, power is applied to the target board but removed from the BMD.

Power Up

The preferred sequence is to apply power to the BMD and the target board simultaneously. This sequence will insure the most reliable operation of the BMD. NOTE: The BMD will rarely be harmed should power be applied first to the BMD then the target board. The same is true should power be applied in the reverse order.

Power Down

The preferred sequence is to remove power from the BMD and the target board simultaneously. This sequence will insure the most reliable operation of the BMD.

NOTE: The BMD will rarely be harmed should power be removed first from the BMD then the target board. The same is true should power be removed in the reverse order

Starting The SourceGate II Debugger

This section gives instructions on starting the SourceGate II debugger. Among the various issues relating to starting SourceGate there are preference settings (.ini file entries), environment variables and command line arguments. Of these only the command line arguments will be described here, and then only those that relate to getting SourceGate to communicate with the emulator or BMD in use. The preference settings, environment variables and the remaining command line arguments are not central to starting SourceGate and are therefore addressed only in SourceGate's Online Help.

Command Line Arguments

The following are the SourceGate command line arguments applicable to getting SourceGate to communicate with the emulator or BMD.

NOTE: If conflicting command line arguments are used then those appearing later on the command line have precedence.

NOTE: The communications channel defaults to serial port COM1 with a default baudrate of 38400.

Download Port

This command line argument specifies the parallel port to use when file downloads are performed using the parallel port option. The supported ports include LPT1, LPT2, LPT3 and PRN. If this command line argument is omitted then the default of LPT1 is used. This argument is case insensitive.

Syntax: -d<port>

Example: -dlpt1

Ethernet Host

This command line argument specifies that communications take place over ethernet and specifies the host name or address to use. The parameter can be either a host name (i.e. hmi_mpc) or an ethernet address (i.e. 192.9.200.201).

Syntax: -i<host>

Example: -ihmi_mpc
-i192.9.200.201

Help

This command line argument invokes a help screen presenting the user with the set of possible command line arguments.

Syntax: -h

Example: -h

Processor

This command line argument specifies the processor type being used. If the argument is given without a parameter, then SourceGate will prompt the user with a list of supported processor options. If this argument is omitted while using an emulator, then SourceGate will default to the processor type reported by the emulator. If this argument is omitted while using a BMD, then SourceGate will prompt the user with a list of supported processor options. This argument is case insensitive.

Syntax: -p[processor]

Example: -p
-pmpc860

Serial Port

This command line argument specifies that communication take place over the serial port and specifies the specific serial port to use. The supported ports include COM1, COM2, COM3 and COM4. This argument is case insensitive.

Syntax: -<port>

Example: -com1

NOTE: Some operating system restrictions may apply to the use of COM3 and COM4.

Serial Port Baudrate

This command line argument specifies the baudrate to be used when communicating via a serial port. The supported baudrates include primarily 9600, 19200, 38400, 57600, and 115200. If this command line argument is omitted then the default of 38400 is used.

Syntax: -<baud>

Example: -115200

NOTE: Emulators support the additional baudrates of 110, 150, 300, 600, 1200, 2400 and 4800.

USB Protocol

This command line argument specifies that communication take place over USB. It also specifies the protocol to be used by HMI's USB driver, along with an optional relative selection index. The protocol must be the string HMIUSB. The relative index specifies which available device to select. If a number is not given then a value of one (1) is assumed and the first available HMI device is selected. Otherwise the N^{th} available device is selected. This argument is case insensitive.

Syntax: -u<protocol>[index]

Examples:	-uHMIUSB	Select the first available HMI device.
	-uHMIUSB1	Select the first available HMI device.
	-uHMIUSB2	Select the second available HMI device.

Starting SourceGate

Executable Name

In the following steps the SourceGate executable name is given merely as *SG*. This is used only as a placeholder for the real executable name, which varies with the Windows version and emulator or BMD in use according to the below table. When the term *SG* is encountered in the below examples simply replace it with the appropriate executable name from the table below.

Windows Version	HMI Product	Executable name
Windows 3.1x	Emulator	sg2.exe
	BMD	sg2bmd.exe
Windows 95/98/Me/NT/2000/XP	Emulator	sgate32.exe
	BMD	sg2bmd32.exe

Windows 95/98/Me and Windows NT/2000/XP

Method 1

The preferred method is to select the SourceGate menu item installed under the application and SourceGate menus during installation. This method starts SourceGate using the startup options specified during installation. Begin by clicking the Start button from the Windows Task Bar. Then select the "Program" menu item, followed by the "SourceGate II Version 4" menu item (the name may vary), followed by the appropriate SourceGate program menu item (the name will vary).

Method 2

An alternate method is to invoke SourceGate at the DOS prompt. This method requires that the command line arguments be entered as documented above. Begin by opening a DOS shell then changing to the directory where SourceGate was installed. Then enter the appropriate command and arguments on the command line. Examples:

Command Line Example	**Description (* indicates default)**	
SG -com1 -115200 -p860	I/O Channel: Port & Baudrate: Processor: Parallel Port:	serial COM1 at 115200 baud Motorola MPC860 LPT1 *
SG -ihmi_332 -p68332	I/O Channel: Host: Processor: Parallel Port:	ethernet hmi_332 Motorola 68332 LPT1 *
SG -uusbbmd -p5307	I/O Channel: Descriptor: Processor: Parallel Port:	USB usbbmd Motorola ColdFire 5307 LPT1 *
SG -dlpt2 -p	I/O Channel: Port & Baudrate: Processor: Parallel Port:	serial (default) COM1 at 38400 baud * prompt the user LPT2

Windows 3.1x

Method 1

The preferred method is to open the SourceGate program group then double click on the SourceGate icon, both of which must have been added by the user. This method starts SourceGate with the user's designated startup options. Begin by opening the Program Manager. Then open the SourceGate program group (the name may vary) and double click on the appropriate SourceGate icon (the name may vary).

Method 2

An alternate method is to invoke SourceGate from the Run dialog. This method requires that the command line arguments be entered as documented above. Begin by clicking the Run menu item under the Program Manager's File menu. Click the Browse button to locate the SourceGate executable then click OK. At the end of the Run dialog's Command Line field add the appropriate command line arguments. Refer to the examples given in the previous example table. Then click on the dialog's OK button.

Revision Table

Revision	Description
1.00	Initial Release
1.01	Various minor updates. Added that neither the CD installer nor the SourceGate installer run under Windows 3.1x.
1.02	Various corrections and updates. Additional notes and warnings. Incorporated documentation of the newer style USB BMD jumpers.
1.03	Updated documentation of SourceGate's -u command line argument, which has new functionality. Changed page size.
1.04	Various Corrections
1.05	Added Windows XP USB-BMD Installation Instructions
1.06	General Layout Fixes